Lumina Summary

Foundation for Next-Generation Intelligent Transport Applications

This summary presents a higher compliance standard for new development and implementation under the concept **"Foundation for next-generation intelligent transport applications."** It is designed as a plain-language overview for decision makers, program leaders, product teams, and strategic partners.

The model is organized in two complementary domains:

- **Lumina Uni**: the requirements that the world's best automotive manufacturers should meet.
- **Lumina Altium**: the requirements that the world's best aerospace companies should meet.

The goal is not only to satisfy today's common industry expectations, but to raise them so that organizations are prepared for intelligent, connected, software-driven, and AI-supported transport systems.

Purpose of the Model

The purpose of this model is to define a clearer and more demanding foundation for companies that want to build safe, reliable, intelligent, and future-ready transport products.

In simple terms, the model helps organizations answer five essential questions:

1. Are products consistently built with excellent quality?
2. Are they safe for people to use?
3. Are they protected against cyber threats?
4. Can software be updated, traced, and improved over time?
5. Is the organization ready to integrate AI responsibly into its products and operations?

For the automotive side, the model builds on globally recognized expectations for quality management, functional safety, cybersecurity, and secure software updates, including IATF 16949, ISO 26262, ISO/SAE 21434, and UNECE R155/R156.

For the aerospace side, the model builds on globally recognized expectations for quality management and design assurance, including AS9100, ARP4754A, DO-178C,

and DO-254, which are central to safe aircraft systems, software, and hardware development.

Lumina Uni

Requirements for Leading Automotive Manufacturers

The best automotive manufacturers should meet the following standards:

- A company-wide quality system that prevents defects, reduces waste, and improves performance continuously.
- A safety culture where critical vehicle functions are designed to avoid harmful failures.
- A cybersecurity management system that identifies threats early, protects the vehicle during production and after sale, and supports regulatory approval.
- Secure software update capability so vehicles can be improved safely after delivery.
- Full traceability from requirements to testing, release, and field monitoring, especially for software-intensive vehicles.
- Readiness for software-defined vehicle development, where vehicle value increasingly depends on software, connected services, and rapid improvement cycles.
- Responsible AI integration for driving assistance, perception, diagnostics, and fleet learning, with human oversight and safety evidence.

Higher Standard Proposed by Lumina Uni

Lumina Uni raises the current baseline in four practical ways:

1. It treats cybersecurity, safety, software updates, and quality as one integrated discipline rather than separate departments.
2. It requires proof that secure and safe behavior is maintained not only at launch, but through manufacturing, updates, maintenance, and real-world operation.
3. It expects organizations to be structurally ready for software-defined vehicles and AI-enabled functions, not only for traditional hardware programs.

4. It promotes evidence-based decision making, meaning that claims about safety, quality, and intelligence must be supported by traceable records and verification results.

The ultimate purpose of Lumina Uni is not to stand alone, but to work in harmony under a shared **Lumin** standard. Together, they encourage automotive organizations to align their practices, share intelligence, and pursue a common goal: building trustworthy intelligent transport systems that serve people, the planet, and future generations.

Lumina Altium

Requirements for Leading Aerospace Companies

The best aerospace companies should meet the following standards:

- An internationally aligned quality management system for aviation, space, and defense.
- Clear system engineering discipline so that aircraft functions, architecture, and safety expectations remain aligned from concept to operation.
- Rigorous assurance for airborne software and electronic hardware according to the level of risk involved.
- Strong traceability so every requirement, design choice, test, and approval can be followed clearly.
- A mature safety culture that makes failure prevention, verification, and accountability part of everyday.
- Secure integration of digital systems, data, automation, and future AI capabilities under formal safety.

Higher Standard Proposed by Lumina Altium

Lumina Altium raises the current baseline in four practical ways:

1. It connects classic aerospace certification discipline with the realities of intelligent, data-driven, and AI-supported systems.
2. It requires software, hardware, system design, and operational monitoring work as one assurance.
3. It promotes earlier preparation for AI safety assurance instead of waiting for AI use to become widespread before defining.

4. It expands the idea of compliance from documentation alone to real organizational readiness, repeatable engineering practice, and continuous evidence generation.

The ultimate purpose of Lumina Altium is to operate as part of a single **Lumin** standard, side by side. Together, aerospace will coordinate their efforts, exchange lessons learned, and pursue a common goal: creating a unified, intelligent transport ecosystem where safety, security, and human benefit are always the priority.